IN THE SPECIFICATION:

Please amend paragraph 5 at page 7 as follows:

The coefficients generated by 19 are then loaded into the filter coefficient area 21 and into the bank of digital ~~all-pass~~ allpass filters depicted by 22. The reason that there is a bank of filters is because the sample rate of the filters being designed to compensate the channel will not necessarily be the same sample rate of the stimulus – in fact it is usually much less. Furthermore, the sample rate of the system being compensated, if lower than the sample rate of the stimulus, will not be sufficiently sampling the channel to provide accurate measurements of vital time-domain parameters with a single-shot acquisition.

Please amend paragraph 2 at page 17 as follows:

A requirement is a reasonable guess at the values of α_s and β_s. These can be arrived at empirically by finding reasonable values ~~the~~ that cause the fit to succeed and then statistically analyzing typical resulting values calculated for ~~of~~ α_s and β_s.

Please amend paragraph 2 at page 19 as follows:

1. ~~if~~ If the specification on mse is reached. The mse specification is supplied by the tolerance 62 (which is specified customarily as root-mean-square (rms) error in ns). Generally, this is not depended on and the mse specification is kept very low. This is because if the system reaches a low mse, it may hit the local minimum only a few iterations later. Generally, the few extra iterations are desired for even better error minimization. You can see that the default specification used for tolerance 62 is 0.

Please amend paragraph 3 at page 19 as follows:

2. ~~if~~ If λ reaches a maximum value (1e10). Sometimes, this indicates divergence, but this situation sometimes occurs at the convergence point if convergence went undetected. The bottom line is that for huge values of lambda, further convergence will be extremely slow on subsequent iterations, so even if it hasn't converged, the iterations should stop and a new strategy should be attempted.

Please amend paragraph 3 at page 19 as follows:

3. ~~if~~ If λ reaches a minimum value (1e-10) – at this value of λ, the system is known to have converged well.

Please amend paragraph 5 at page 21 as follows:

The design of anti-aliasing and interpolating filters of this sort are well known to those skilled in the art.

Please amend paragraph 1 at page 22 as follows:

Another element of care that must be taken is that of filter startup. All filters require some amount of samples over which ~~there~~ their outputs need to stabilize due to the fact that the filter has not been sampling the input signal for all time. The amount of time required is based on the length of the impulse response of the allpass filter. Since the allpass filter shown (without loss of generality) is an infinite impulse response (IIR) filter element, a decision must be made to determine the startup time. Generally, one uses the number of samples required for the step response to reach 99% of its final value. In this description, the uncompensated channel response acquired has been chosen such that it is 5 ns in duration, and the edge occurs at the 2.5 ns point, the points preceding the edge are all the same. By subtracting out the baseline of the

step, 2.5 ns worth of zero valued points are generated (500 zero valued points). This means that as long as the allpass filter impulse response length is less than 50 points for a 20 GS/s filter, that no special care is needed apart from normalizing the uncompensated channel response by subtracting out the baseline.

Please amend paragraph 6 at page 28 and continuing at page 29 as follows:

In Figure 20, the uncompensated group delay of the channel 105 is shown, along with a power curve estimate of this characteristic 106. The optimizer searched the region denoted by 107, admittedly searching this region with functions limited to those in the form of Equation 6. It is interesting to observe that the final group delay characteristic for compensation chosen is 108. Not only is 108 not very close to 105, it is not even close to 106, which is an approximation of the channel characteristic in exactly the same form as those utilized for the search. As a matter of fact, utilizing the approximate characteristic 106 to compensate the situation in Figure 2 results in the substandard results shown in Figure 3 whereas utilizing the compensation provided by the allpass filter 109 to compensate Figure 2, results in the superior compensation shown in Figure 4. Figure 21 shows group delay characteristics of the uncompensated and compensated channel and demonstrates that the optimum group delay characteristic is not one in that causes the group delay characteristic to be constant and flat. Furthermore, no amount of examination of the group delay characteristics shown in Figure 21 provides any clues regarding the optimality of various group delay characteristics on the simultaneous minimization of risetime and preshoot.